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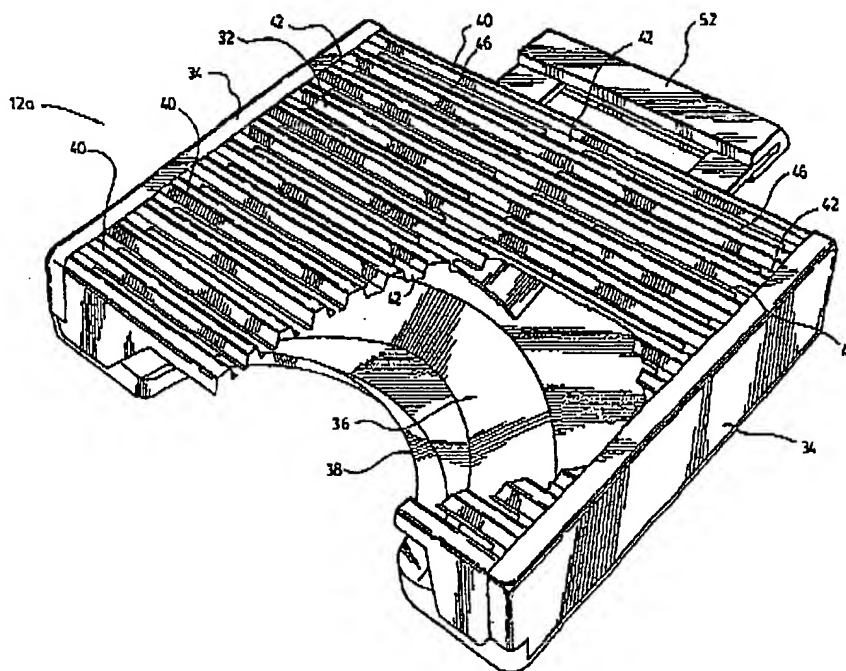
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(21) International Application Number: PCT/CA98/00763 (22) International Filing Date: 7 August 1998 (07.08.98) (30) Priority Data: 2,211,495 8 August 1997 (08.08.97) CA (71) Applicant (for all designated States except US): WOOD-FLAME INC. (CA/CA); 910 Boulevard Industriel, Saint-Jean-sur-Richelieu, Québec J3B 8J4 (CA). (72) Inventor; and (75) Inventor/Applicant (for US only): PATENAUDE, Jean-Pierre (CA/CA); 1738 route 132, St-Anicet, Québec J0S 1M0 (CA). (74) Agent: ROBIC; 55 Saint-Jacques, Montréal, Québec H2Y 3X2 (CA).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report.

(54) Title: COOKING APPARATUS AND GRILL ASSEMBLY THEREOF

(57) Abstract

The grill assembly (12) comprises a housing (30) including a cooking surface (32), sidewalls (34) skirting the cooking surface (32) and a bottom wall (36) including an inlet (38) adapted to be sealingly connected to a source of heat to prevent heat loss and to promote collection of the heat in the housing (30). The cooking surface (32) comprises a base plate (42) and a plurality of parallel ridges (40) projecting from the base plate (42) for supporting food to be cooked and spacing the same from the base plate (42), thereby allowing the food to be cooked by radiation and conduction. The base plate (42) is provided with a plurality of slits (46) located between the ridges (40) for allowing a flow of hot gases through the base plate (42) and the food to be also cooked by convection. A support (16) is provided to support the housing (30) over a source of heat. This invention reduces heat required and provides a means for controlling different types of heat transfer.



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COOKING APPARATUS AND GRILL ASSEMBLY THEREOF

FIELD OF THE INVENTION

5 The present invention relates generally to the field of cooking apparatus and accessories thereof. More particularly, it relates to a grill assembly for a cooking apparatus that improves heat transfer and provides taste cooking by radiation, conduction and convection at the same time.

BACKGROUND OF THE INVENTION

10 The present invention relates to an arrangement of a means to collect heat and to transfer it to cook food. It is a compact one piece assembly acting as a heat retainer and transfer. It collects, gathers and provides, through the
15 arrangement of its components, selective heat transfer process from a heat source to the food to be cooked. Cooking is a transformation process whereby the heat modifies food for consumption. The transformation process involves or is affected by temperature, time, equipment and medium. Food cooking is
20 done for appearance, flavour and sometimes conservation. The processes of heat transfer are radiation, conduction and convection, each process having its own characteristics and producing specific transformation of the food in its structure, appearance and flavour. Cooking process involves heat
25 consumption. Considering a heat saving in this field would amount to huge saving. This invention has been conceived to operate with a flame burner as the heat source because it is the most widely used. However, it could easily be adapted to different heat sources.

30 Well known in the field of grills used with cooking apparatus, there is obviously the typical grill which consists of an assembly of parallel metal bars that is placed over any type of source of heat and that serves to support the food over the heat. A drawback with that type of grill which is commonly
35 used in ovens, with portable stoves used in camping or with outdoor barbecues is that it allows the food to be cooked randomly by convection and a little bit by conduction and by

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radiation. In other words, they lack of control over convection, conduction and radiation. Also the cooking apparatus which uses that type of grill are generally not adapted or are not designed for saving energy. A lot of heat produced is lost with that type of grill and cooking apparatus.

There is still presently a need for an energy saving grill that will allow food to be cooked at the same time by conduction, convection and radiation on a ratio base to obtain a special taste.

SUMMARY OF THE INVENTION

An object of the present invention is to propose a grill assembly for a cooking apparatus that will satisfy the above-mentioned needs.

In accordance with the present invention, that object is achieved with a grill assembly characterized in that it comprises a housing including a cooking surface, sidewalls skirting the cooking surface and a bottom wall including an inlet adapted to be tightly connected to a source of heat to prevent heat loss and to promote collection of the heat in the housing. The grill assembly is further characterized in that the cooking surface is made of metal and comprises a base plate and a plurality of parallel ridges projecting from the base surface for supporting food to be cooked and spacing the same from the base plate, thereby allowing the food to be-cooked by radiation and conduction. The base plate is provided with a plurality of slits located between the ridges for allowing a flow of hot gases through the base plate and the food to be also cooked by convection. A support is provided to support the housing over a source of heat.

This grill assembly, because of its specific characteristics, provides heat transfer from the heat source to the food in an energy saving manner while allowing the food to be cooked by radiation, conduction and convection.

Another object of the present invention is to propose a cooking apparatus that comprises a grill assembly as described hereinbefore.

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A cooking apparatus including a grill assembly according to a preferred embodiment of the present invention will now be described in more details with reference to the appended drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a cross-sectional side elevational view of a cooking apparatus including a grill assembly according to the present invention.

10 Figure 2 is a cross-sectional front elevational view of the cooking apparatus of figure 1.

Figure 3 is an enlarged perspective partly cut view of a half unit of the grill assembly of figure 1.

15 Figure 4 is a cross-sectional side view of a grill assembly similar to the one of figure 1 shown without the deflector and the handle.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to figures 1 and 2, the cooking apparatus (10) in a general manner comprises a grill assembly (12), a tubular burner (14) and a support to mount the grill assembly (12) over the burner (14) and which preferably consists of an open container (16) adapted to receive therein the burner (14) in an upright position. As can be appreciated, in this preferred embodiment, the burner (14) is mounted on a dome-shaped member (79) set on the bottom wall (17) of the container (16). The dome-shaped member (79) with the bottom wall (17) of the container (16) are defining an air-receiving chamber (70) devised to provide air in the combustion chamber (60) for the combustion of a fuel therein. A pump means (74) is connected to the air-receiving chamber via a conduit (72). The container (16) has sidewalls (18) each having an upper edge (20) adapted to receive and support a corresponding outer edge (22) of the grill assembly (12) such that the grill (12) is mountable over the burner (14) which is enclosed in the container (16). More particularly, the upper edge (20) of each of the sidewalls (18)

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defines an L-shaped shoulder on which a corresponding outer edge (22) of the grill (12) is resting.

Referring now also to figures 3 and 4, the grill assembly (12) comprises a housing (30) including a cooking surface (32), sidewalls (34) skirting the cooking surface (32) and a bottom wall (36). The bottom wall (36) includes an inlet (38) which is preferably a circular aperture provided in that bottom wall (36) adapted to be tightly connected to the upper edge (15) of the burner (14) from which the heat is exiting to prevent heat loss and to promote collection of the heat in the housing (30). In other words, the edge (15) or contour of the burner (14) is fitting close in the circular aperture (39) of the bottom wall (38). In this manner, almost no heat from the burner is lost as it is transferred to the housing (30).

As can be appreciated from figure 1, the grill assembly (12), which is particularly adapted to be used with a portable stove, consists of two half units (12a,12b) that together constitute the whole grill assembly (12). However, the grill assembly may very well consist of a single unit, as shown in figure 4.

Referring to figures 3 and 4, the cooking surface (32) is made of metal, preferably stainless steel and comprises a base plate (42) and a plurality of parallel ridges (40) projecting from the base plate (42) for supporting food (44) to be cooked and spacing the same from the base plate (42), thereby allowing the food to be cooked by radiation and conduction. The base plate (42) is provided with a plurality of slits (46), as best seen in figure 3, located between the ridges (40) for allowing a flow of hot gases, as shown in figure 4, through the base plate (42) and the food to be also cooked by convection.

More preferably, the cooking surface (32) consists of a corrugated metallic plate comprising ridges (40) having an apex (41) of a given width allowing the food (44) to be cooked by conduction, the ridges (40) alternating with grooves forming the base plate (42).

As shown in figure 3, in order to obtain a uniform cooking, the slits (46) are disposed in rows in the base plate

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(12). Moreover, each slit (46) is preferably transversely filling the space defined between two adjacent ridges (40).

As can be appreciated from figure 4, as the grill assembly (12) is positioned over the burner (14) in a sealed manner, the heat from the burner (14) (not shown) is directly transferred to the cooking surface (32) of the grill assembly (12) and then it is transferred from the cooking surface (32) to the food (44) by radiation from the base plate (42), by conduction from the apex of the ridges (40) and by convection from the flow of hot gases through the base plate (42) via the slits (46) therein.

In order to further improve the heat transfer and the cooking process, the grill assembly (12) illustrated further comprises a deflector (50) within the housing (30), as best shown in figures 1 and 2, mounted above the inlet (38) of the bottom wall (36) to buffer and distribute a flow of gas from the heat source. The deflector (50) spread and elongate the gas fuel in store to allow a spread combustion. Preferably, the deflector (50) is a convex metallic plate extending centrally and transversely within the housing (30).

The cooking surface (32), the sidewalls (34) and the bottom wall (36) of the grill assembly (12) are preferably made of a metal of poor thermal conductivity, most preferably stainless steel.

For a practical point of view, the grill assembly (12) may advantageously include handles (52), as shown in figure 1.

As can be appreciated, the grill assembly acts as a heat retainer and transfer device which collects most of the heat and promotes specific heat transfer process to the food to be cooked. This invention reduces heat required and improves heat transfer in cooking.

With a grill assembly device according to the present invention, the food is cooked through conduction by contact with a support surface heated by convection, through convection in a direct manner from a flow of gases and through radiation in a direct manner from the plate.

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WHAT IS CLAIMED IS:

1. A grill assembly (12) characterized in that it comprises:

5 a housing (30) including:

a cooking surface (32),

sidewalls (34) skirting the cooking surface (32); and

10 a bottom wall (36) including an inlet (38) adapted to be tightly connected to a source of heat to prevent heat loss and to promote collection of the heat in the housing (30);

the cooking surface (32) comprising:

15 a base plate (42) and a plurality of parallel ridges (40) projecting from the base plate (42) for supporting food to be cooked and spacing the same from the base plate (42), thereby allowing the food to be cooked by radiation and conduction, the base plate (42) being provided with a plurality of slits (46) located between the ridges (40) for allowing a flow of hot gases through the base plate (42) and the food to be also cooked by convection and radiation; and

20 a support to support the housing (30) over a source of heat.

25 2. A grill assembly (12) according to claim 1, characterized in that the cooking surface (32) is a corrugated metallic plate comprising the ridges (40) having an apex (41) of a given width allowing the food to be cooked by conduction alternating with grooves forming the base plate (42).

30 3. A grill assembly (12) according to claim 2, characterized in that each of the slits (46) in the metallic plate (42) is transversely filling a space between two adjacent ridges (40).

35 4. A grill assembly (12) according to anyone of claims 1 to 3, characterized in that the cooking surface (32), the sidewalls (34) and the bottom wall (36) are made of stainless steel.

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5. A grill assembly (12) according to anyone of claims 1 to 4, characterized in that it further comprises a deflector (50) within the housing (30), mounted above the inlet (38) of the bottom wall (36) to buffer and distribute a flow of gas from the heat source.

6. A grill assembly (12) according to claim 5, characterized in that the deflector (50) is a convex metallic plate extending centrally and transversely within the housing (30).

7. A grill assembly (12) according to anyone of claims 1 to 6, characterized in that the inlet (38) of the bottom wall (36) is a circular aperture provided therein.

8. A grill assembly (12) according to anyone of claims 1 to 7, characterized in that the grill assembly (12) consists of two half units (12a,12b) that together constitute the whole grill assembly (12).

9. A cooking apparatus (10) characterized in that it comprises:
a grill assembly (12) as defined in anyone of claims 1 to 8; and

a tubular burner (14) having an upper edge sealingly connectable with the inlet (38) of the bottom wall (36) of the grill assembly (12).

10. A cooking apparatus (10) according to claim 9, characterized in that the support comprises an open container (16) adapted to receive therein the burner (14) in an upright position, the container (16) having sidewalls (18) each having an upper edge (20) adapted to receive and support a corresponding outer edge (22) of the grill assembly (12) such that the grill assembly (12) is mountable over the burner (14) enclosed in the container (16).

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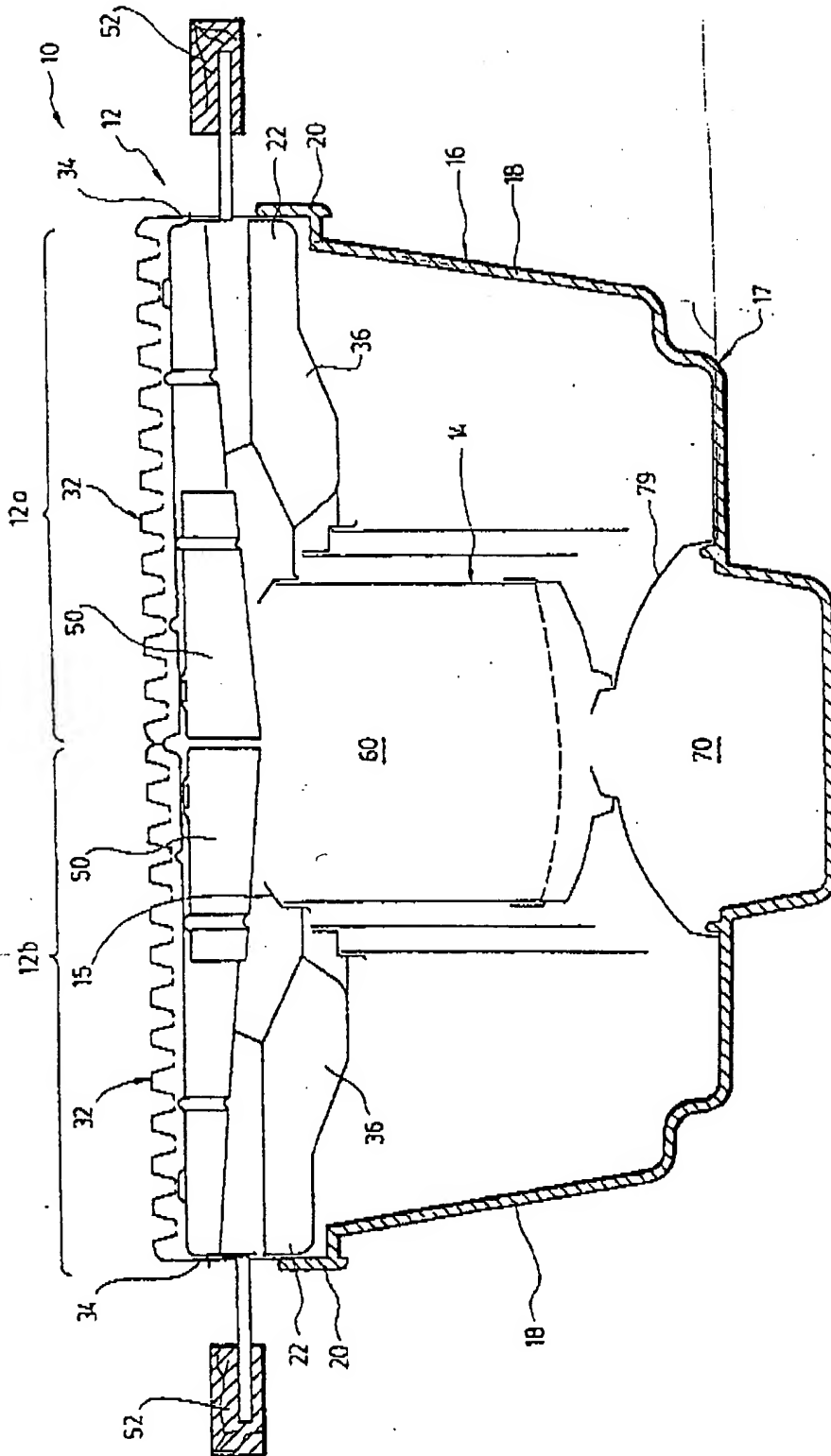


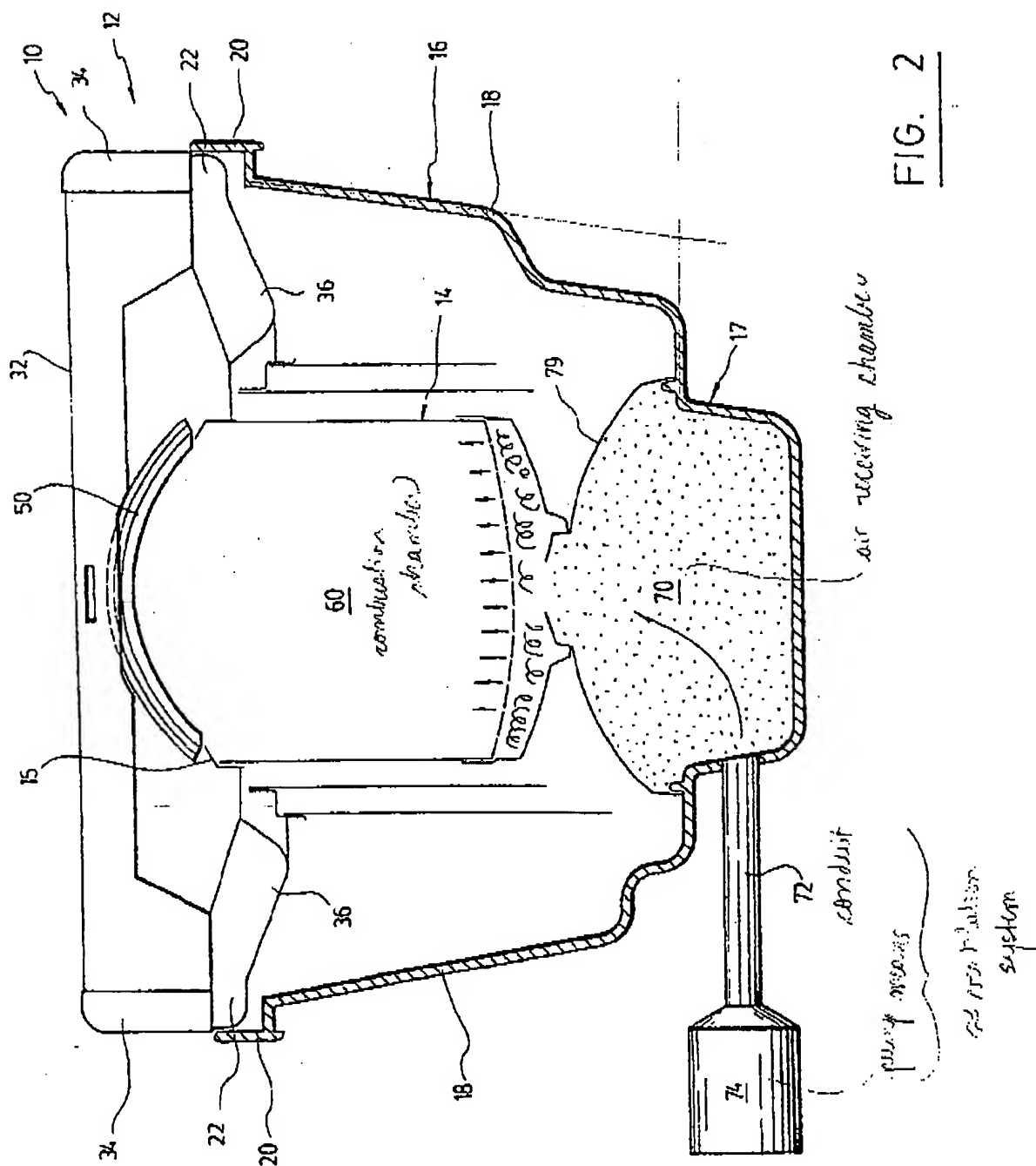
FIG. 1

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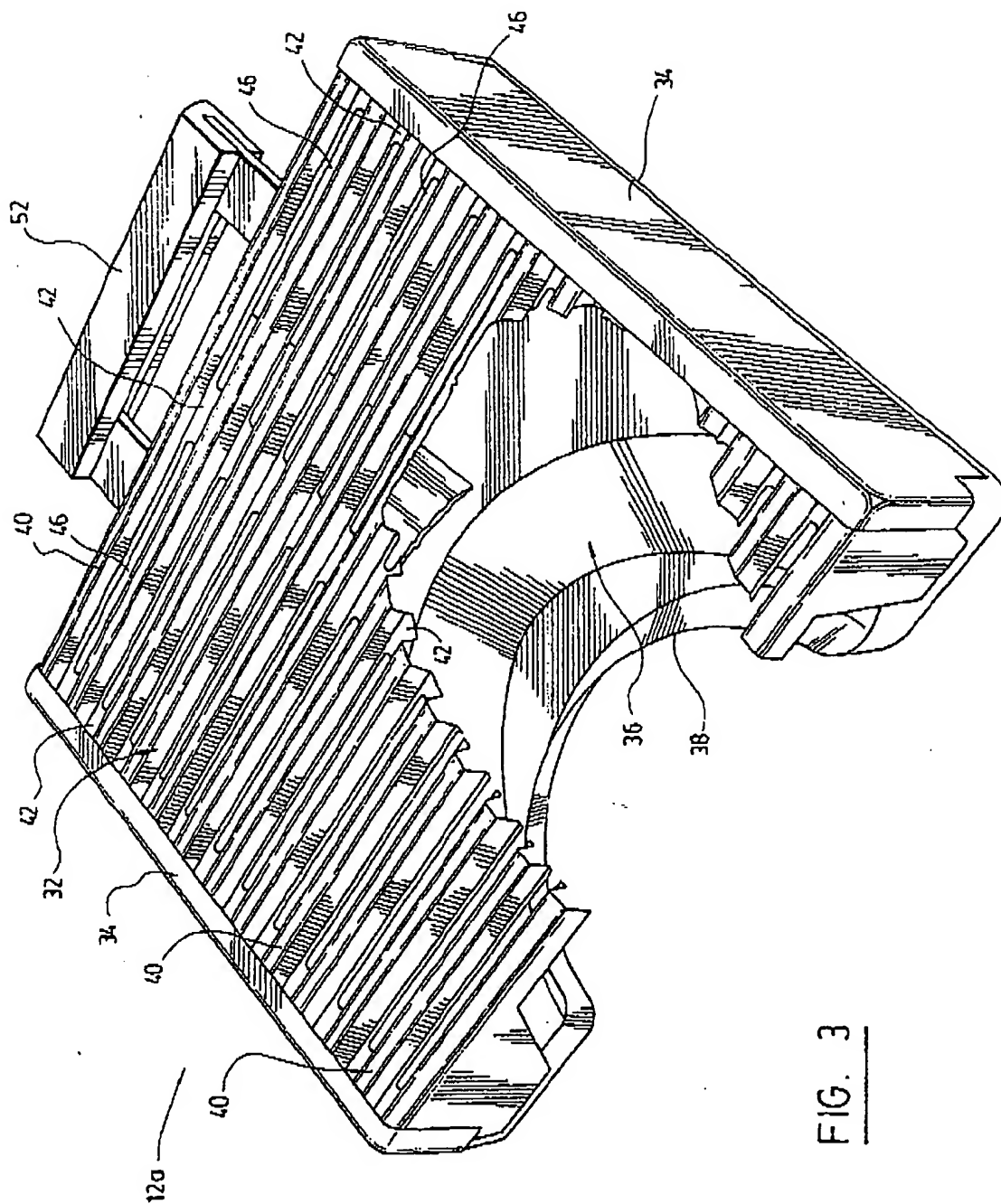


FIG. 3

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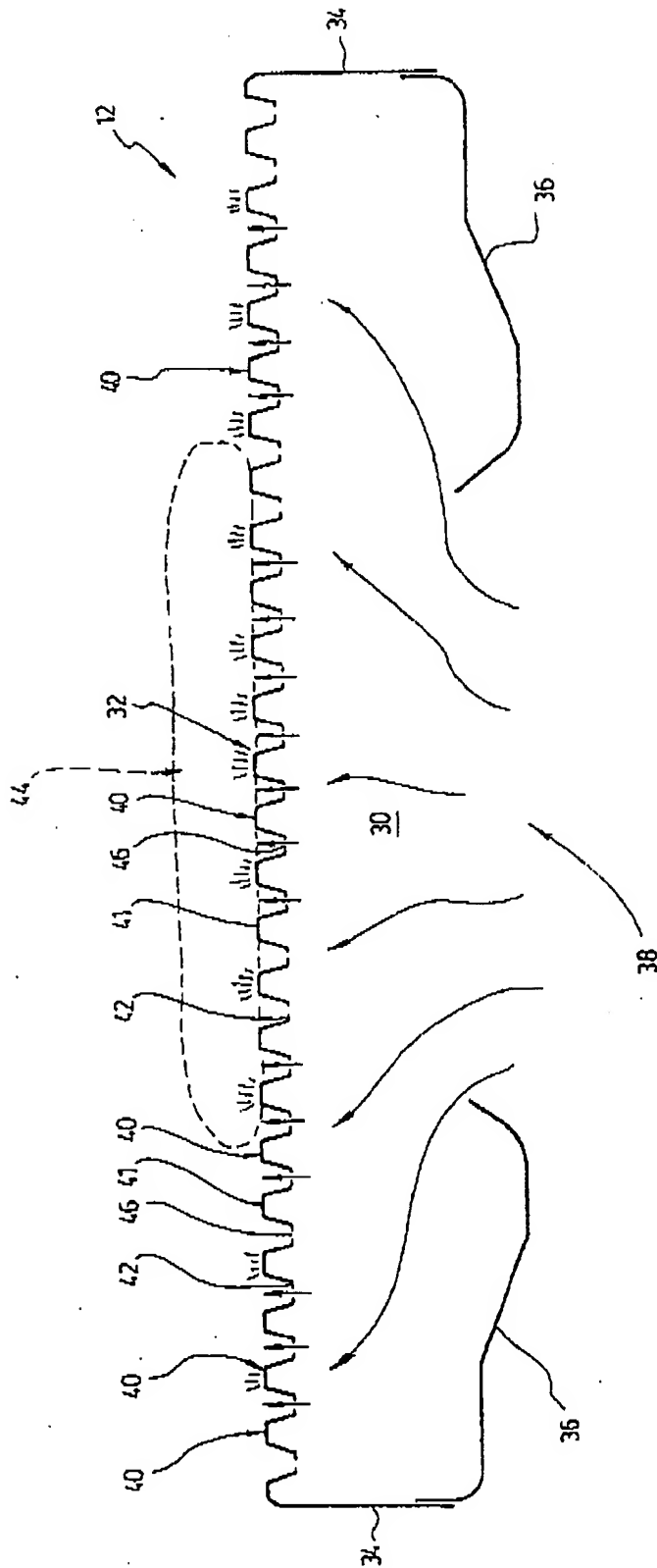


FIG. 4

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INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A47J37/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 647 339 A (EZRA SHALOM) 15 July 1997	1-4,7,9, 10
Y	see column 1, line 29 - column 2, line 12; figures 1-3,7,9	5,6
Y	WO 89 11066 A (HERTFORD PTY LTD) 16 November 1989 see page 6, line 21 - page 6, line 32; figure 1	5,6
X	US 5 105 725 A (HAGLUND ALLEN C) 21 April 1992	1-4,7,9, 10
Y	see column 1, line 1 - column 4, line 9; figures 1,2,7	8
Y	US 4 936 202 A (LIN PAUL) 26 June 1990 see abstract; figure 2	8
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Date of the actual completion of the international search

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26/11/1998

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 355 780 A (CAMPBELL MICHAEL F) 18 October 1994	1-3, 7, 9
A	see column 1, line 1 - column 3, line 56; figures	10
A	US 4 403 541 A (BERGER BERNARD B) 13 September 1983 see column 1, line 25 - column 2, line 53; figures 1, 2	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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